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None

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## (54) Joints in suction passages, vacuum cleaners

(57) A joint (2) for members (3, 14) defining a suction passage (15) of a vacuum cleaner has one member (14) with pivot pins (4) projecting from opposite sides and another member (3) assembled from two parts (5, 6) around them. The pivot pins have spring elements (10) projecting radially, and parts (9) of these co-operate with detents (13) in an annular cavity (12) formed by the other member (3) so that, as the joint is tilted, the spring element (10) snaps in and out of the detents (13). The joint can thus be adjustably set at any of a number of positions, without any externally operated catch. A swivel joint may also be provided in passage (15).

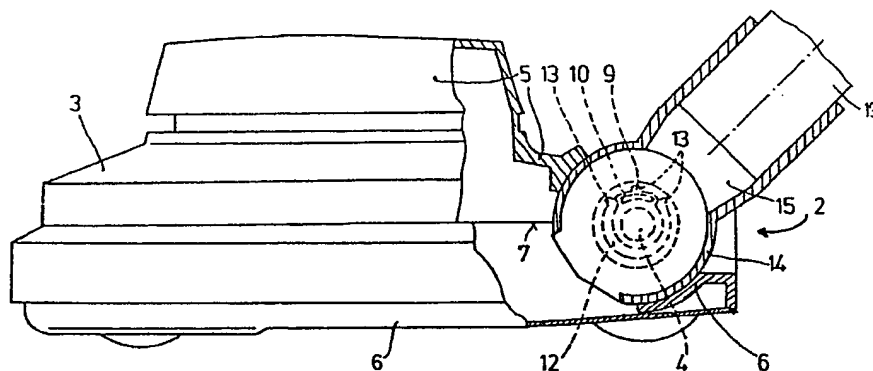


Fig. 2

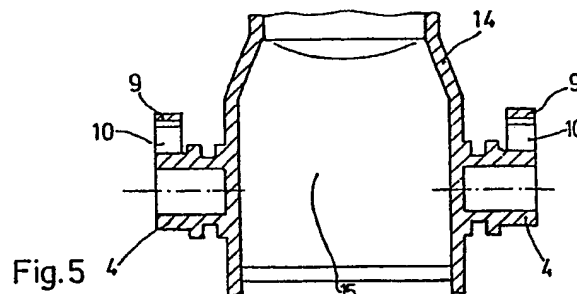


Fig. 5

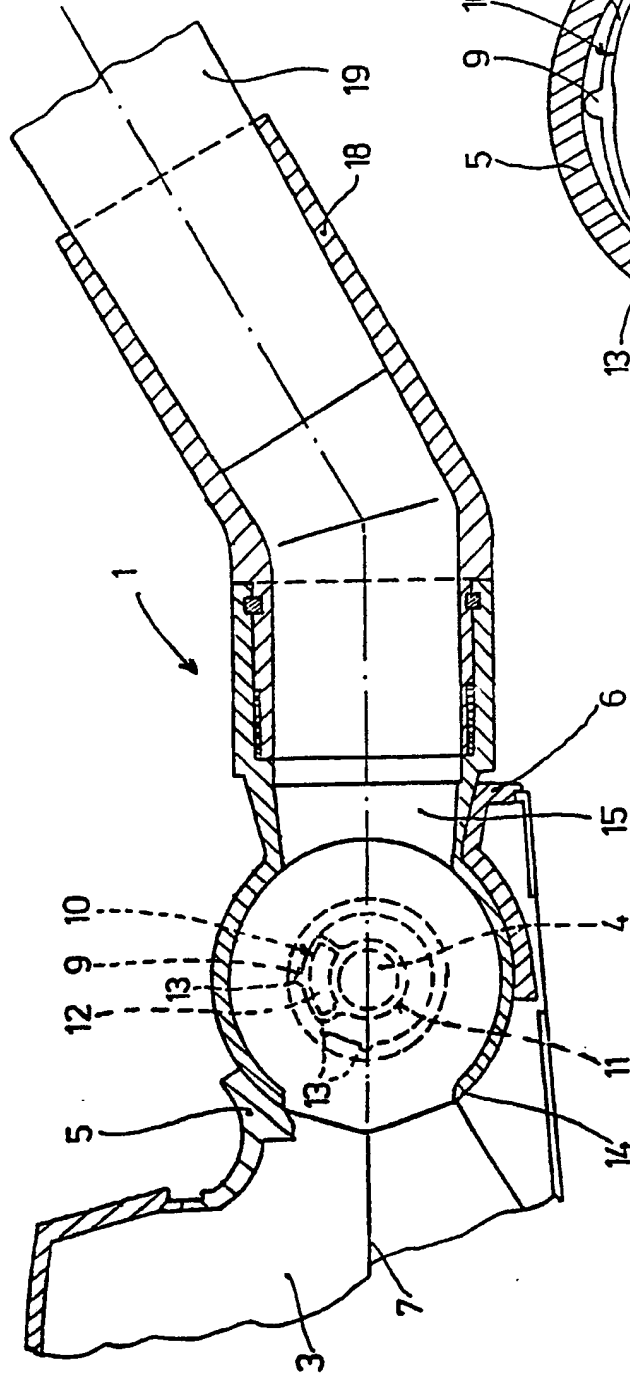


Fig. 1

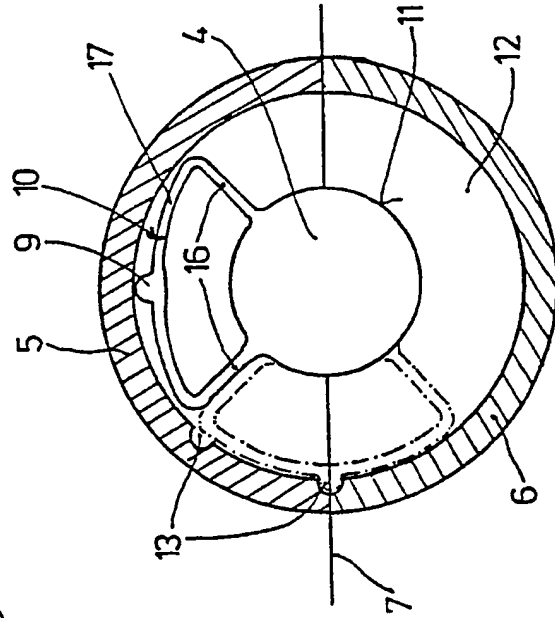
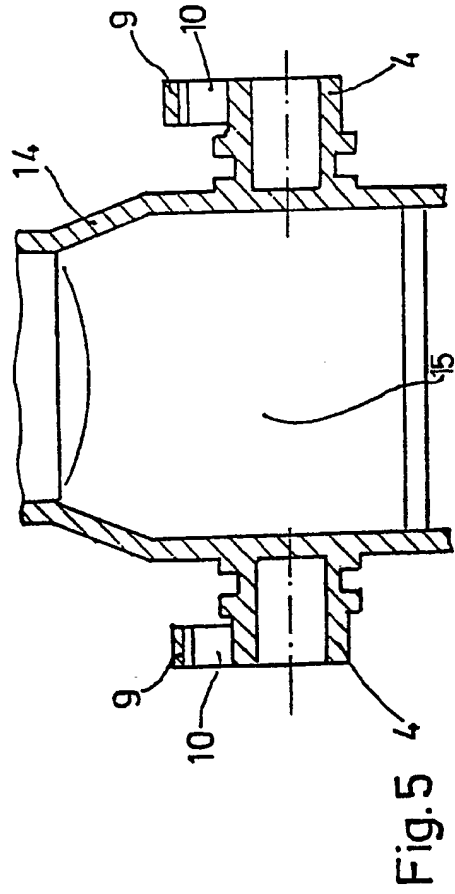
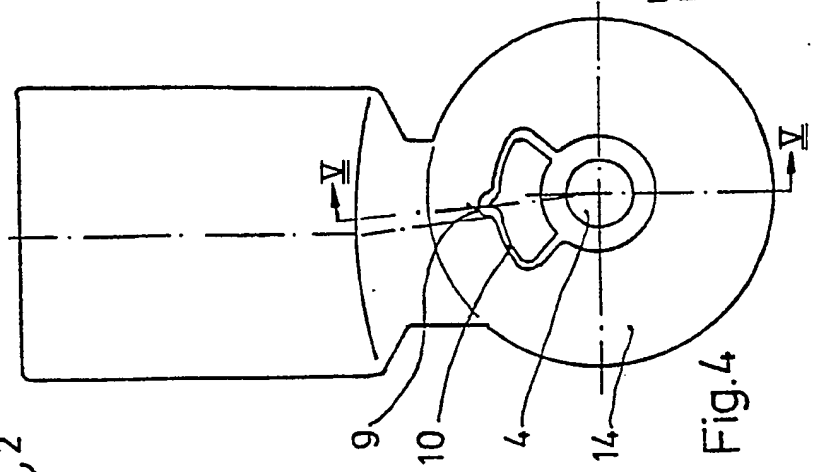
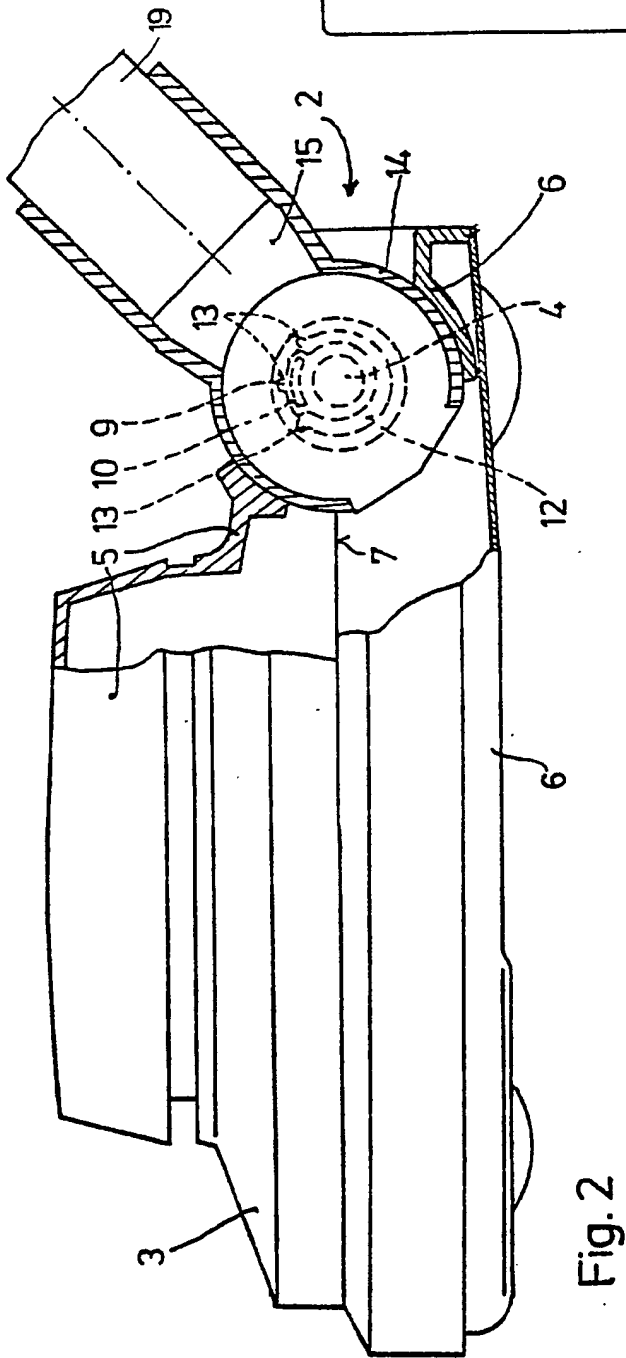


Fig. 3

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Improvements Relating to Vacuum Cleaners

This invention relates to vacuum cleaners and is concerned with the joint between two members defining a suction passage. Such a joint may be tiltable, (that is the two members may pivot about an axis transverse to the passage), swivelable (that is the two members may rotate relative to one other about the axis of the passage), or there may be a combination of such movements. These enable the nozzle or intake end to be manipulated into corners, underneath furniture and so on while still bearing correctly against the surface to be cleaned.

However, it is not always desirable for a movable joint to be completely free. Often it is useful to be able to set it in a particular position, both when working and for carriage and storage. But the arrangements for locking such joints in set positions have usually involved manual or foot operated catches which are bulky, entail several discrete elements assembled together, and generally increase the cost and complexity of the assembly.

It is the aim of this invention to provide a simpler

and less expensive joint which can be held firmly in a number of different positions.

According to the present invention there is provided a joint for members defining a suction passage of a vacuum cleaner, a first member having pivot pins on opposite sides of the suction passage and a spring element projecting from at least one said pin, and a second member being assemblable around said first member and said pins to be pivoted on the latter, and having detents with which the spring element can snap engage to hold the members adjustably in a selected one of several mutually pivoted positions.

Preferably, the or each spring element is moulded integrally with the associated pivot pin, and the latter may itself be moulded integrally with said first member.

Conveniently, the or each spring element projects radially and comprises spokes joined by a bow centred on the pivot pin and which closely co-operates with an annular cavity in said second member, the bow having an outward projection for snap engagement with said detents, which are in the outer wall of said cavity. These spokes may be angularly spaced by about 90°.

For a better understanding of the invention, some embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a longitudinal section of a composite

joint between a nozzle and a suction tube of a vacuum cleaner,

Figure 2 is a side elevation, partly in vertical section of another joint between a nozzle and a suction tube,

Figure 3 is a cross section of part of such a joint,

Figure 4 is a side elevation of one member providing part of the joint, and

Figure 5 is a section, to an enlarged scale, on the line V-V of Figure 4.

The joints of Figures 1 and 2 have much in common, and are largely referenced identically. But the joint 1 of Figure 1 is slightly more complex, being of the tiltable and swivelable kind, whereas the joint 2 of Figure 2 is simply tiltable. In each case, the nozzle or suction head is indicated at 3, and it can pivot about co-axial pins 4 on outer opposite sides of a member 14 defining the suction passage 15 leading from the nozzle. The latter has a casing constructed from upper and lower parts 5 and 6 which are assembled together around the part cylindrical end of the member 14 to become captive and airtight to that while allowing the tilting movement. The inner ends of the pivot pins 4 are simultaneously trapped by stepped annular bearing surfaces complementary to the shapes best seen in Figure 5, and whose position is indicated by reference 11. The

dividing plane of the two parts 5 and 6 is indicated at 7, and this contains the common axis of the pivot pins 4.

5 The pins are integrally moulded with the member 14 from high grade plastics material. Also integrally moulded with them are spring elements 10, each comprising radial spokes 16 circumferentially spaced by about 90 and joined at their outer ends by a bow 17. In its relaxed condition, as shown in chain-dotted lines in 10 Figure 3, the bow is centered on the pivot axis. At its centre, the bow 17 has an outwardly projecting nose 9, designed to snap engage with detents 13 in the cylindrical wall of a cavity 12 defined by the parts 5 and 6 axially outside the bearing 11. When so engaged, 15 the bow 17 assumes its natural shape, but when the nose is snapped out of a detent and bears against the cavity wall, the bow is flattened and the spokes 16 are slightly spread, as shown in full lines in Figure 3.

Figures 1 and 2 show three detents 13 giving three 20 set positions for the joint, one where the suction passage 15 leads off horizontally from the nozzle 3, a second one where it leads off at 45°, and a third where it is vertical. More or even less detents can be provided if desired, and Figure 3 just shows two. The 25 symmetry of the spring element 10 and of the detents 13 mean that equal force is needed in both directions of

adjustment. This force will depend on the thickness of the spokes 16 and bow 17 and also on the size and shape of the nose 9 and the detents 13.

As illustrated, the spring elements 10 are provided at both sides. However, the arrangement would be workable with just one.

Referring back to Figure 1 the swivel joint is to the rear of the tilting joint and is provided by a tubular elbow 18 partially sleeved into the member 14 and captive to it although rotatable about the common axis. A suction pipe 19 connects to the other end of the elbow, whereas in Figure 2 it connects directly to the member 14.

It will be appreciated that there is no external locking mechanism for operation by hand or foot, and with the unitary construction of the spring elements with the pivot member there is simple economical manufacture.



CLAIMS

1. A joint for members defining a suction passage of a vacuum cleaner, a first member having pivot pins on opposite sides of the suction passage and a spring element projecting from at least one said pin, and a  
5 second member being assemblable around said first member and said pins to be pivoted on the latter and having detents with which the spring element can snap engage to hold the members adjustably in a selected one of several mutually pivoted positions.

10 2. A joint as claimed in Claim 1, wherein the or each spring element is moulded integrally with the associated pivot pin.

3. A joint as claimed in Claim 2, wherein each pivot pin is moulded integrally with said first member.

15 4. A joint as claimed in Claim 1, 2 or 3, wherein the or each spring element projects radially.

5. A joint as claimed in Claim 4, wherein the or each spring element comprises spokes joined by a bow centred on the pivot pin and which closely co-operates  
20 with an annular cavity in said second member, the bow having an outward projection for snap engagement with said detents, which are in the outer wall of said

cavity.

6. A joint as claimed in Claim 5, wherein the spokes are angularly spaced by about  $90^{\circ}$ .

7. A joint for members defining a suction passage  
5 of a vacuum cleaner, the joint being substantially as  
hereinbefore described with reference to the  
accompanying drawings.